

# Return to Flight: Improved imagery systems to provide extra ‘eyes’ on orbiter

By Kendra Ceule

**O**n future Shuttle flights, there may be nearly double the number of ground cameras focused on the vehicle during launch as there have been in the past – as well as new cameras onboard.

In a briefing held at Johnson Space Center on Sept. 16, experts informed the media of the proposed changes to the imagery system. The use of additional cameras, including three on the Shuttle itself, is intended to help experts on the ground quickly identify any potential problems – such as the piece of foam that struck *Columbia* when it launched and was later blamed for the heat-shield breach that destroyed the spacecraft during reentry. The sooner a possible problem is spotted, the sooner it can be addressed.

The view from one of the proposed Shuttle-based cameras might look familiar to viewers who watched the launch of STS-112 in October 2002.

“The External Tank camera will be the same as it was for STS-112, but will be moved to a new location,” said Christine Boykin, Aerospace Engineer in the Space Shuttle Program Systems Engineering and Integration Office. “The new view will include the bipod and the underside of the orbiter and its wings.”

Boykin said that “the current plan is to add cameras to the External Tank and to each Solid Rocket Booster,” providing up-close views of the vehicle during launch and entry into the atmosphere. These views would be supplemented by ground-based cameras: the pre-existing 12 and a proposed nine more.

The new cameras would include five new long-range trackers, for a total of 10; two new medium-range trackers, for a total of seven; and one new short-range tracker, for a total of three. The combination of different views and ranges ensures that the vehicle can be seen from as many angles as possible for as long as possible.

Each set of cameras has its strengths: For example, long-range cameras track the Shuttle longer than a short-range camera can, but the image is less precise as the distance increases. The short-range trackers provide the best detail of any of the ground-based cameras, but are so close to the vehicle – about 1,300 feet away – that it takes two of them to capture an image of the entire Shuttle.

Night launches are another concern for imaging teams. The dark launches are “very difficult because you have to look through the Shuttle’s (exhaust) plume to see the vehicle,” said Bob Page, Intercenter Photography Working Group Chairman.

While adhering to a daylight-only launch schedule will dramatically reduce the number of launch windows, it will enable better and more detailed imagery of each launch – allowing potential problems to be seen and solved that much sooner.

Also participating in the briefing were John Muratore, Manager of Space Shuttle Systems Engineering and Integration, and Dena Hayes, Camera Project Manager for JSC’s Avionic Systems Division.



In Cocoa Beach, Fla., a new five-meter telescope is lowered toward the dome for installation.  
KSC-03PD-2678



(Top inset) A worker looks at a five-meter (focal length) telescope being removed for repair. As part of the Distant Object Attitude Measurement System, the tracking telescope provides optical support for launches from Kennedy Space Center and Cape Canaveral.  
KSC-03PD-2673



(Left) Workers calibrate a tracking telescope.  
KSC-03PD-2504  
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